Contributions to

Western Botany

No. 11

BY MARCUS E. JONES, A. M.

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MARCUS E. JONES, A. M.

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Leucothoe Cusickii.

This species lies between L. acuminata and L. Davisiae. No. 2925b Cusick, Siskiyou Mts., on the border of California, July 30, 1902, 25 to 30 miles from the Coast. Evergreen, with reddish stems, 4-6 ft. high; leaves narrowly elliptical, 2-3 inches long, 5-7 lines wide, dark-green, faintly reticulated, shortly acute at both ends, obscurely serrulate, smooth, on stout and short petioles 1-2 lines long; racemes simple, terminal and in the axils of the uppermost (1-3) leaves, in fruit 4-6 inches long, erect, from broadly deltoid thin scales which also subtend each pedicel; base of raceme not floriferous, but copiously bracted; pedicels slender, 4 lines long, erect, four times the bracts, braceteolate near the base; calyx of thin and triangular-ovate sepals a line long, which are ciliate, widely spreading and flat; flowers white, triangular-urceolate, 3 lines long, smooth; anthers smooth, oblong, not mucronate nor awned, opening only at tip, and with very short, flat and triangular tipes like L. Davisiae; filaments broad, ciliate, subulate from an abruptly enlarged base; capsule depressed-globose; stigmas capitate, barely lobed. Grows on the Illinois river.

NYCTAGINACEAE.

In the Torrey Bulletin for December, 1902, P. A. Rydberg takes up the Nyctaginaceae in order to make some reprisals on the author for his criticisms of his very poor work on Astragalus in the "Flora of Montana.' His work includes the usual grist of spurious species and shows how far astray a man can go who has no conception of generic and specific limitation. One wonders how long the New York Botanical Garden will permit this kind of fictitious botany to go on.

It is rather amusing for Mr. Rydberg to claim special facilities for bibliographical work and then make such blunders as to claim that Vahl never published an "Icones," when, in fact, he published "Icones Illustrationi Planitarum" in 1798-9. One would suppose that he would be more modest after having recently and with his bibliographical facilities, made such blunders as Abronia arenaria and Astragalus Cusickii, both homonyms of well known species.

Abronia ammophila Greene. A. arenaria Rydberg Fl. Mont., 137, not A. arenaria Menzies. This species, which occurs along the shores of Yellowstone Lake, Montana, has no relation to A. pogonantha nor A. micrantha. It belongs to the A. fragrans group. It has the general appearance of A. turbinata and the acute bracts of that species, though a little wider and shorter. The fruit closely resembles the imperfectly developed fruits of that species, but is uniformly without wings or disks at the top, and so is fusiform. The variable pubescence has no value. The leaves are rhombic to oblong-oblanceolate and small, the petiole being double the blade and nearly as long as the slender peduncles. It seems to be a cæspitose perennial. Collected by Martin also in 1901.

Abronia nana var. **lanciformis** No. 4689 Jones collected

at Hackberry, Northern Arizona, May 26th, 1884. This differs from the type in having narrowly lanceolate and acute leaves, acuminate below, and narrowly oblong acute bracts.

Abronia fragrans var. elliptica (E. Nels). A. elliptica E. Nelson Torrey Bulletin 26. 7. The typical from of A. fragrans has acute bracts and leaves. The variety is the common form of the Great Basin, and has broadly elliptical to nearly round and entirely pointless and rounded bracts. It almost passes into A. nana through the following variety.

Abronia fragrans var. pterocarpa. Stems a foot long; leaves and habit of A. fragrans but fruit that of A. nana; bracts nearly round and very large. The type is from my collection at Cottonwood, Utah, near Johnson's Pass, 5,600 ft. alt. June 6th, 1900, growing in sand. Also collected by Bishop many years ago in southern Utah. Connecting forms are my numbers 5096 collected near St. George, Utah, April 24th, 1894, in sand; also Washington, southern Utah, April 14, 1880; also 5149 ay collected at Silver Reef, southern Utah, May 3rd, 1894; 5261u, collected at Springdale, southern Utah, in sand May 17th, 1894; 5284z, collected at Kanab, southern Utah, May 27, 1894, in sand.

Abronia augulata Jones is A. pogonantha Heimerl.

OXYTHECA.

This genus has been the subject of much controversy and uncertainty and has been persistently confused by the reference of two of its species to Eriogonum, and by the uncertain reference of O. inermis, now to one genus and now to the other. By properly separating the species the habit, awns, pubescence and bracts become good generic characters as well as the apparently monoecious flowers, though a few species of Eriogonum are monoecious.

The generic characters are: pubescence never woolly, nor

villous, hispid, often glandular; bracts unilateral when not united into a sheath or broad ring, 2-3, green, acute, awned; involucres deeply and sharply lobed, turbinate (to campanulate?); flowers very small, the staminate smaller and on shorter pedicels; slender annuals; leaves clustered at or near the base, linear to obovate, with a tapering base and short petiole.

O. dendroidea var. **Hillmani** (Stokes ined.)

Intricately much branched from the base, delicate and low, with internodes mostly not over 6" long; most of the peduncles not over one line long, some of the lower ones normal; awns much longer than the minute involucres; flowers all exserted, the fertile the more so and oblong to oval with purplish or green sepals close pressed to the akenes and minutely hispid, sterile flowers whitish, campanulate, barely exserted, open, less pubescent. Reno to Contact, central Nevada, in the Lower Temperate life zone.

Var. **foliosa** (Nutt. Pl. Gamb. 169.)

This is a more robust form with root leaves often 3 lines wide and narrowly lanceolate, and all but the uppermost bracts large and leaf-like, lanceolate and sessile; flowers and last divisions like those of the var. Hillmani; involucral peduncles often 1 line long; plants often cover 2 square feet; involucres long-spined. Same range as the type.

If the limits of Oxytheca are to be extended beyond the awned species then the genus must also include the following species of Eriogonum. E. spergulinum, Parishii, hirtiflorum, and glandulosum. To include these species in Oxytheca will necessitate the reduction of Oxytheca to Eriogonum.

ERIOGONUM.

Eriogonum marifolium var. **incanum** (T. & G. Proc. Am. Acad. 8 161,) E. incanum, T. & G.

This is a more compact form, with densely fascicled leaves, stouter stems, and the whole plant hoary. It abounds in the Southern Sierras in similar situations.

E. umbellatum var. **stellatum** (Benth. Linn. Soc. Trans. 17.409.)

Slender plants with cymosely-compound umbels; flowers mostly small, about 1½ lines long, yellow; lateral rays bracted in the middle. This includes E. tripodum and cognatum Greene. Henry Mts., E. Utah, northwestward, to Marysvale, and southward to the Mogollons in Arizona, and thence westward to the eastern side of the Sierras in the Middle Temperate life zone.

E. umbellatum var. **polyanthum** (Benth. D. C., Prod. 14, 12.)

Leaves spatulate to elliptical, small; rays 1-3, rarely 5, the latter bracted in the middle, one of the bracts of the main umbel generally large and leafy. This connects with the var. stellatum through E. polyanthum var, bahiaeforme. Plants glabrous to white pubescent. Eastern Oregon on dry and stony hills, Eastern California along the Sierras to Owen's Valley. In the Lower Temperate life zone.

E. umbellatum var. **Torreyanum** (Gray Proc. A. A. 8 158.)

Umble simple; leaves glabrous, ovate to oblong-spatulate; 2-4 inches long, yellow, at least the outer rays bracteate and with a flower or two, rarely a variously produced ray arises from these bracts. E. ellipticum is a connecting form. This connects with the type through E. dumosum Greene. Middle Mts. of Southern Idaho and adjacent regions to the Sierras in the Middle Temperate life zone.

E. umbellatum var. **subalpinum** (Greene Pitt. 3 18.)

This is a tall and long-peduncled form, with dense leaves which are very pubescent below and elliptical to oblanceolate and acute; flowers white; bracts large; stems more densely compacted than usual; it much resembles E. heracleoides. It abounds in the higher mountains of Colorado, Wyoming and westward, extend-

ing southward to middle Utah, Nevada, etc. It blooms July to September.

E. umbellatum var. **Hausknechtii** (Dammer Garden Fl. 40 493.)

Rays very short or none; involucres small, 2½ lines long, including the long teeth; flowers yellow, 2 lines long; peduncles short; umbel simple; leaves broad; stems very much, and intricately branched, short and very slender. This occurs in the Alpine regions of Mt. Hood, Oregon, in very loose volcanic gravel.

E. umbellatum var. **Tolmieanum** (Hook. Fl. Bor. Am. 2 134.)

Involucre one, large, with leaf like lobes, sessile at the ends of the slender and short peduncle. This includes E. Porteri Small and is the var. monocephalum T. & G. This frequents the lower edge of the Alpine region in the mountains of Colorado, Utah and Nevada.

In addition to these varieties of E. umbellatum there are about fifteen synonyms of the species based on fictitious vegetative characters by Greene and Small.

E. sphæracephalum var. **brevifolium** Stokes,

Peduncles about four inches long, with about 3 rays, the outer rays being leafy-bracteate in the middle, so the inflorescence seems cymose; flowers yellow; involucres about 3 lines long; pubescence of flowers ascending, not dense; leaves elliptical, slightly revolute and sessile; bushes nearly a foot high and rather open. Western Nevada and adjacent California on the east of the Sierras in the Middle Temperate life zone. E. tripodum Greene is a form of this.

E. sphærocephalum var. **megacephalum** (Nutt. Pl. Gamb.) Stokes.

Heads large, and flowers many; rays slender 3-5, not bracted in the middle. This is the common form of E. Oregon to Idaho and northward.

E. cæspitosum var. **Douglassii** (Benth. DC. Prod. 14 9.)

Peduncles bracted in the middle, with leaflike bracts; flowers 3-4 line long. This is normally a more robust form of the Blue Mts., region. It also occurs at Reno, Nevada, and northward.

E. cæspitosum var **Kelloggii** (Gray Proc. Am. Acad. 8 293.)

This is a similar plant with smaller glabrous flowers and more villous pubescence, which occurs near Mt. Shasta, Calif.

E. Lobbi var. **robustum** (Greene Proc. Cal. Acad. 3 127.)

Densely matted and rigid; leaves 1-2 inches long, much thicker, short petioled, often rhomboidal; peduncles, petioles and inflorescence, densely white-shaggy; inflorescence very compound, dense and long bracted, forming a cluster 1-3 inches long; flowers 2½ lines long, very broad and rounded, floral peduncles very stout, 1-2 inches long, erect. Grows in the Middle Temperate life zone in Western Nevada, along the Sierras, at Reno.

E. flavum var. **polyphyllum** (Small. Rydb. Fl. Mont. 119.)

Involucres sessile and heads large and subtended by leafy bracts which equal or exceed the heads. In the most reduced forms the leaves are not over an inch long, densely clustered and petioles not visible; peduncles almost none to 2 inches long. High alpine, Colorado, and northward.

E. flavum var. **androsaceum** (Benth. DC. Prod. 14.)

Flowers narrow, mostly gradually reduced to a short stipe, varying from greenish-yellow to light yellow in the type; scapes and rays slender; leaves and bracts nearly linear, insensibly reduced, with the petiole longer than the blade; plants prominently villous all over, the crowns not so densely clustered as in E. caespitosum. Upper Temperate life zone of Idaho, Montana and northward to Lat. 56 degrees in British America.

E. flavum var. **Piperi** (Greene Pitt. 3 263.)

Flowers yellowish-white, sharply reduced to a long stripe;

leaves oblanceolate, 4-6 lines wide; otherwise as in E. androsaceum. An intermediate form is No. 6507, Jones Cuddy Mts., Idaho, having the leaves of E. Piperi, a less produced stipe and more tapering and golden-yellow flowers. A similar form from the Yellowstone, also E. Oregon and Washington. Blooms in summer.

E. Jamesii var. **undulatum** (Benth. DC. Prod. 14 7.) Stokes.

Said to have much smaller flowers; with ovate and undulate and revolute leaves; from Northern Mexico. The plants hitherto reported from Arizona, are only the var. flavescens, and not this form.

E. saxatile var. **Stokesæ** (Jones Cont. 8 40) Stokes, E. Bloomeri Parish.

Peduncles long, appearing glaucous, cymosely branched only above and with sessile involucres in all the forks, the uppermost branches shortly racemose; flowers greenish-white, stipe very broadly winged from the outer sepals down; flowers broader and shorter; leaves obovate, about 1½ inches long, thinly pubescent. Panamint Mts., California, on the edge of the Tropical life zone also in the San Bernardino Mts., Cal.

E. niveum var. **dichotomum** (Douglas DC. Prod. 14.) Stokes.

Whole plant woolly except the flowers; leaves oblanceolate, or acute or obtuse; lower bracts produced; inflorescence cymosely-umbellate; involucres mostly single, about 3 lines long, constricted at mouth (?) strongly toothed, outer sepals broadly elliptical, inner linear-spatulate. Helena, Mont., to California.

E. ovalifolium var. **nivale** (Canby Death Valley, Rep. 187.) E nivale Canby l. c.

This is a much reduced alpine form, with a single involucre, small leaves and short peduncles. It occurs in the high Sierras; similar forms are also found in Southern Idaho.

E. ovalifolium var. **anserinum** (Greene Pitt. 4 320.)

This is a Western Nevada form with simple or compound umbels having a sessile involucre in the center of the main umbel and the secondary ones when present, the latter bearing only two rays. The twisted petioles of which so much is made in the description are simply accidents to the type and are not found in other specimens. This grows in the Middle Temperate life zone along the Eastern side of the Sierras from Reno, Nevada northward. The writer has duplicate type specimens.

E. ochrocephalum var. **angustum**

This connects the type with E. brevicaule var. pumilum and is close to E. spathulatum and E. pauciflorum, but cannot be a hybrid as the other species do not grow with it. It has the flowers, peduncles and heads of E. ochrocephalum with an occasionally unequally rayed umbel and the leaves of E. brevicaule. Deep Cr. Mts., to the Oquirrh Mts., Utah, and Antelope Is., in Great Salt Lake, in the Middle Temperate life zone, on rocks. Very variable.

E. pauciflorum var. **Panguicense,**

Leaves short and very blunt, oblong-spatulate, little revolute, not over 2 inches long; peduncles filiform, 6-12 inches long; involucres closely sessile, few. Panguitch, Utah, June 24, 1890. Probably too close to the type.

E. acaule var. **longilobum** (Jones Cont. 7 20.)

Much resembling the type, but less densely matted; leaves broadly-oblanceolate, on a petiole nearly as long as the blade, margin inclined to be revolute, obtuse; peduncles 1-2 inches long, with 3-5 sessile involucres in a dense head; involucres parted nearly to the base, the lobes 2 lines long, and with green tips; sepals obovate-oblong, rounded, yellow, with darker or green midrib, often tinged with red, barely 1½ lines long. Navajo Basin, Lower Temperate life zone, in similar places; also intermediate forms on the Great Salt Lake Desert. This is probably the type of

A. acaule, but I am not able to say surely. Blooms June to November.

E. acaule var. **Shockleyi** (Wat. Proc. Am. Acad. 18, 194,) E. Shockleyi Watson, E. pulvinatum Small.

E. Cusickii.

Stems in loose mats, crowns small; leaves revolute, delicate, oblanceolate, obtuse, the blade fully half the whole, flat, on slender petiole; peduncles filiform, 3-4 lines long, erect; flowers in a nearly simple cyme or small umbel, which is about 1 inch wide; central involucre nearly sessile, rays short, 2-4 lines long, and with either a sessile involucre or with a cyme whose lateral involucres are sessile in their bracts; involucres campanulate, 1½ lines long, smooth, with short teeth, scarcely angled, green; bracts small, hyaline, reddish, woolly margined; flowers yellow, oblong, 1 line long, outer sepals broadly oblong and nearly truncate at tip, the inner much narrower and equaling them. This has the habit of E. Kingii and is near it.

Found growing on a stony desert, Harney Co., Oregon, June 26, 1901, No. 2603 Cusick.

E. brevicaule var. **pumulum** Stokes.

Inflorescence and involucres pubescent, the latter rigid; rays very unequal, one to several, short, heads large and more copiously flowered; always sessile in the first fork; leaves linear. This grows at Colton and Kyune in the Coal Range, Utah, on the upper edge of the Lower Temperate life zone, on rocks, at 6,000 feet altitude.

E. chrysocephalum x brevicaule.

This hybrid has the oblanceolate and crimped leaves of E. chrysocephalum, about 1½ inches long, and habit of this species but it has the inflorescence of E. brevicaule; there is every kind of a gradation between with still shorter leaves, which are elliptical and with either single or compound heads. This abounds in the

Wasatch Mts., in the Middle Temperate life zone.

E. Wasatchense.

Stems shortly produced, 1-2 inches long, densely leafy, leaves narrowly elliptical, greener above, with crimped edges, about 1-1½ inches long; petioles short; peduncles about 1 foot long, repeatedly 3-forked at the end into a narrow and paniculate corymb with moderately unequal rays; involucres single, nearly sessile in the forks and sessile on the ends of the slender ultimate branches, 2-2½ lines long, campanulate, bluntly and scariously toothed, scarcely angled above, like the connate bracts in being ciliate-woolly on the margin; flowers white, 1 line long, with oblong sepals. This is close to E. Batemani.

E. Batemani.

Leaves oblong-elliptical, triangular at tip, leathery, nearly equally pubescent on both sides, on a short and stout petiole nearly half the blade; stems densely clustered at the top of the ground and leaves fasicled there, rather stout; peduncles about 6 inches long where they branch into their unequal and slender rays, the longest of which nearly equal the peduncle, these again branch into 2-3 nearly filiform raylets which are 2-4 inches long and widely spreading, and with a single involucre, mostly sessile in the forks, the raylets tipped with about 2 sessile involucres; campanulate involucres 2 lines long, nearly smooth, not angled, apparently acutely toothed, but the acute green portion is really very obtuse by being broadly and scariously margined; flowers few, white; sepals white, smooth, barely united below, oblong and barely enlarged at tip, 3-4 lines long; bracts minute, united into a flat disk which is 3-angled, hyaline margined and toothed. Price, Utah, on clayey knolls.

E. nudum var. perturbum. Var. pauciflorum Wat. Watson Proc. Am. Acad. 12 264.

A form with single involucres in all the forks and on the

ends of the raylets, and is a smaller plant. It frequents the Southern Sierras in the Lower Temperate life zone.

E. sabulosum.

Leaves linear-cuneate, not revolute, rounded at tip, very shortly-pubescent on both sides; peduncles 3-5 inches long, stout, divided at tip into 3 and these again three-divided and with one (rarely two) slender-peduncled involucre, the raylets similarly divided and re-divided to the end, forming a wide corymb, primary rays about as long as the floral peduncle, raylets half the rays and with their divisions in proportion; involucres narrowly-bell-shaped, 1½-2 lines long, shortly toothed, scarcely any sessile; flowers yellow, broad, few, about 1 line long, with elliptical sepals united one-third the way up; inflorescence smooth and glaucous to the base, except the woolly margins of the bracts; bracts green, very small, triangular; lower peduncles 6-9 lines long; tufted plants about 1 foot high, proper stems reduced to crowns. Green River, Wyo., on barren clay in the Lower Temperate life zone. Jones.

E. Grangerense.

Somewhat similar to E. sabulosum in habit, but leaves narrowly-elliptical, 1-2 inches long, tapering into a slender petiole about as long as the blade; floral peduncles slender, 3-6 inches long, similarly branched, but rays 1-2 inches long and with 2-4 short raylets bearing single involucres at the end which all have bracts near their base except the central ones, which are bractless, and about 9 lines long; involucres broadly campanulate, deeply and obtusely and scariously toothed, 2 lines long; flowers rather many and similar, but white; sepals united to the middle; proper stems reduced to crowns. This may be a variety of E. sabulosum, but it seems very distinct. It grows in similar situations at Granger, Wyoming.

E. Ostlundi.

Inflorescence repeatedly bi-to-trifurcate with nearly equal rays

and a rather slender pediceled involucre in the forks, divisions successively shorter till the ultimate ones are 2-10 lines long, and bearing 1-3 nearly sessile involucres, which are 1½-2 lines long, campanulate, scariously toothed and smooth, flowers white and red, barely 1 line long, with oblong sepals; stems many; inflorescence in a widely spreading and rounded corymb. This simulates E. nudum in its more slender forms, and the stems are reduced to compact crowns. Grows on clay banks in Sevier Valley, Utah, near Joseph City, also found at Marysvale, Utah, No. 5388v Jones, June 13, 1894. In the Lower Temperate life zone.

E. nummulare.

Leaves orbicular, not revolute; blade about 6 lines long, on a slender petiole half as long, alternate on the short stems for an inch or two which are produced into stout peduncles 1-3 inches long which then branch into wide panicles with racemose ends and usually have a leaf at the lowest fork; stout involucral peduncles 2-3 lines long, not conspicuously angled, short-toothed, green; flowers reddish-brown with white tips, many; outer sepals broadly oblong, about ½ line long, united about one-third the way up; whole plants densely white-woolly, flowers sparsely so. Dutch Mt., Western Utah, growing in sand in the Lower Temperate life zone.

E. Eastwoodæ E. ramosissimum Eastwood Proc. Cal. Acad. 2 6 322, not E. tenellum, var. ramosissimum Torr.

Stems shrubby, intricately and diffusely branched, several from a woody root, about 1½ feet high, leaves linear-lanceolate, 10-14 lines long, 2-2½ lines wide, woolly on both sides, but less densely so above, margin slightly revolute and undulate, petioles short and about 1 line long; inflorescence widely spreading and divided racemosely with long and flowerless internodes 3-4 inches long, upper branches of inflorescence cymosely panicled; involucres 1 line long, few, like those of E. brevicaule and contracted at mouth, the lower only peduncled, the rest sessile; flowers 3-5, contracted and tips of sepals orbicular, rose-colored and with crimped

margins. This grows in the Lower Temperate life zone in Southeastern Utah.

E. corymbosum var. glutinosum (Jones Cont. 7 719) E. aureum Jones and its varieties.

This is an intricately branched form of E. corymbosum with smaller involucres and golden yellow flowers; the pubescence being much denser and the inflorescence still more reduced and very short peduncled; the leaves in the type are broadly elliptical and nearly sessile, but they vary to narrowly oblong and crimped, with the flowers rather racemose on the upper side of the branches after the fashion of E. Jonesii. This approaches E. sulcatum in habit. The varieties ambiguum and glutinosum are only variant forms not worthy of varietal rank.

E. fasciculatum var. ericæfolium (T. G. Proc. Am. Acad. 8 170 (1870).

This is a starved form making a very low bush and having leaves only about 2 lines long, and nearly sessile heads. It grows in Arizona near Fort Whipple. Same life zone.

E. michrothecum var. laxiflorum (Nutt. Pl. Gamb.; Benth. D. C. Prod. 14.)

This is a well nourished form with narrowly oblong leaves 1 inch long; short stems and long floral peduncles with lax and few flowered cymes, with involucres broadly turbinate, 2 lines long, all peduncled; the central peduncle nearly 1 inch long. Middle Temperate life zone in the Sierras.

E. Friscanum.

Like E. bicolor in habit, leaves and size, but inflorescence in a compound cyme with all the involucres pediceled, narrowly bell-shaped, less than 1 line long; flowers about 3/4-line long, with oval outer sepals. Frisco, Utah, in the Lower Temperate life zone. Blooms in June.

E. sulcatum var. **Argense.**

Internodes, not grooved, slender; leaves revolute and appearing linear, 6 lines long. Argus Mts. Same zone.

E. deflexum var. **insigne** (Watson, Proc. Am. Acad. 14 295).

More robust plants with long and ascending branches; involucres on slender peduncles about 3 lines long, which are often erect; sepals round.

E. nutans T. & G. Proc. Am. Acad. 8 181, E. rubiflorum Jones Cont. 5 281.

E. trachygonum var. **subscaposum** (Wat. Bot. Cal. 2 29.)

This is a still more compact form with short peduncles and few involucres, and is found in the high Sierras.

E. luteolum (Coville Death Valley Rep. 190 t 21) Phyllogonum luteolum Coville l. c.

E. flexum var. **Ferronis.**

This is a small plant with glandular hairy and nearly reniform leaves and glandular inflorescence, except the smooth and only flexuous involucral peduncles; involucres cleft nearly to the base, lobes triangular; bracts broader than in the type. Ferron, Utah, on clay soil in the Lower Temperate life zone.

E. alatum var. **Mogollense** Stokes.

As in the type, but leaves spatulate and rounded at tip. San Francisco Mts., N. Ariz. Grows in the Middle Temperate life zone. Blooms in August.

E. Gordoni Benth. is E. capillare Small Torr. Bull. 25 51.

E. collinum Stokes.

Similar to E. subreniforme, but leaves round and rarely cordate at base; inflorescence less divided; umbels only twice divided and then shortly corymbose, open and sparsely flowered; pubescence wholly floccose-woolly, sparse on

the upper side of leaves, main peduncles and bracts; flowers about ½-line long, yellow-hispid below, white with pink stripes, with broadly ovate sepals. Reno, Nevada, in the Middle Temperate life zone. Blooms in early summer.

E. Thomasii Watson is E. minutiflorum Watson.

E. comosum (Jones Cont. 7 719), E. reniforme var. comosum Jones l. c.

E. comosum var. playanum.

Involucres glandular-pubescent after the fashion of E. pusillum. No. 5064 bc Jones. Mica Spring, S. E. Nev., April 14, 1894. Also on Darwin, Mesa, Cal., April 28, 1897, Jones, Reno, Nevada, Hillman.

E. angulosum var. gracillimum (B. & W. Bot. Cal. 2 480). E. gracillimum B. & W. l. c.

E. Arizonicum Stokes.

Resembling E. rotundifolium, but taller and more slender; leaves round to reniform; biennial, with a sparingly branched base. Arizona in the Tropical life zone.

E. sessile Stokes.

Low plants, intricately branched at the crown into innumerable, short and racemosely compound, rather stout (for the plant) divisions which are rarely over 6 lines long; the terminal involucres seem to be on peduncles 2-4 lines long; leaves obovate, densely woolly below; flowers few, about ¾ lines long, much larger than the involucres; sepals broadly oblong and smooth, spreading; involucres about one-third line long, campanulate, deeply lobed. Grows at Reno, Nevada, in the Lower Temperate life zone. Blooms in summer.

E. Baileyi var. Davidsoni (Greene.)

This is a more robust form than the type, with flowers and

involucres 1 line long. Mojave Desert. Blooms in the fall.

E. Baileyi var. **porphyreticum** Stokes.

This is an intermediate form with involucres 1 line long and minute flowers. Grows at Palisade, Nevada, along with E. brachyanthum, in the Lower Temperate life zone.

E. nidularium Coville Death Valley Rep. 186.

Coville takes up the E. Plumatella T. & G. Proc. Am. Acad. 8 179 (not Dur. & Hilg.) and rightly makes it a new species, but he falls into the same error in part as those whom he copies, and thereby continues the confusion. Torrey and Gray there had three species or well defined forms in view, the original E. Plumatella, E. gracile, T. & G. (not Benth), and E. nidularium. Their description of E. plumatella so far as it refers to the Nevada forms is for the most part their E. gracile, but that part referring to the incurved inflorescence belongs with what Coville intended should be his E. nidularium. Since they describe their species as having white or red flowers and only sometimes incurved inflorescence, and since those forms without the incurved inflorescence are common in Nevada and belong to a good species wholly distinct from E. gracile they must take the name E. nidularium, for Coville's description of his species follows his reference to the E. Plumatella of T. & G. as his type. This leaves the plant of Coville without a name, and it is now supplied as E. nidularium

tinct species, characterized by the lemon-yellow flowers with very

var. **Luciense.** To most botanists it would appear as a very dis-

wide and panduriform outer sepals, and nest-like inflorescence, but there are intergrading forms.

E. nidularium Coville.

Like the variety but more open and usually less branched; involucres about 1 line long: flowers white with green or red midrib, about ¾-line long, outer sepals moderately enlarged at tip and somewhat rhomboidal; ends of the flower clusters not incurved

with age. This has hitherto been taken for E. gracile, which is quite a different plant. It passes by insensible gradations into the variety and is the most common of all the Great Basin species. E. gracile has a prolonged and leafy stem and leaves oblanceolate and tapering into petiole.

CHENOPODIACEAE.

A recent study of this family emphasizes the remark of Watson that the species and genera must be studied in the field in order to obtain an accurate idea of their limitations. The work of Watson was the best ever done on the family, and yet it is impossible to accept his limitations or conclusions as a whole. The family is remarkable for its insensitiveness to climatic influences, and its consequent indifference to zonal limitatons. The same species will grow anywhere from the Middle Temperate to the Tropical life zone, provided the soil is alkaline; and in a few species, such as Monolepis chenopodioides, even the soil need not be alkaline always. Considerable stress has been laid on leaf-character in classification, but this fails in most cases, particularly in Suæda, Chenopodium and Atriplex. In Atriplex the shape and appendages of the bracts have been made much of, but as will be shown in this paper they are very uncertain quantities. Doubtless there are twice as many species recognized as exist, but there is as yet no way of determining the validity of half of the species except by the most careful and long continued field work, which as yet is a minus quantity.

Suaeda Torreyana and S. intermedia do not hold their characters as given by Watson. Both are said to be common in our region, but the prevailing form has the leaves of S. intermedia and the flowers of S. Torreyana.

Suaeda occidentalis Watson is supposed to have been found

only by Watson is Ruby Valley E. Nevada, but what seems to be the same occurs in various places from Colorado Springs, Colorado to Oregon.

Kochia Americana var. **Californica** Wat. Proc. Am. Acad. 17 378 (1882). K. Californica Watson l. c.

Atriplex Nuttallii Watson. A. eremicola Osterhout Torr. Bull. 25 284, A. pabularis A. Nelson. The first is a form with sides of bracts unappendaged and with linear leaves; the last is a form with margins of bracts greener, more bluntly toothed and with sides occasionally toothed.

A. Nuttallii var. Utahensis.

This is a form with linear leaves, and fruit a nearly round and sessile burr with very short and sharp processes all over it. This is No. 1760 Jones from Salt Lake City, and is the more common form in Utah.

Var. falcata. This is like the var. anomala, but with leaves still narrower and longer; flowers densely clustered in the axils, many, the central 1-3 on filiform pedicels 1-4 lines long; fruiting bracts linear lanceolate, falcate, entire, acicular at tip, about 4 lines long, prismatic, about 1 line wide, mostly without teeth on the face and without green margins, the outer flowers nearly sessile with shorter tips and copiously muricate or toothed on the sides and margins below. This simulates A. phyllostegia in the peculiar development of the flowers. This apparently very distinct species connects with the var. anomala through western Utah forms. Weiser, Idaho, July, 1899, Jones.

Var. anomala.

Leaves nearly linear, 4-24 lines long, sessile many; flowers of both kinds in simple or leafy and panicled spikes; fruiting bracts sessile, with an ovate base and long-accuminate, about 3 lines long, without teeth, rarely obscurely muricate on the face or with an oc-

casional green tooth; flattened, united almost to the tip. This is also a very remarkable form apparently distinct, but shades into the type in western Utah through forms with more green teeth and many processes on the face, and by forms from Wyoming in the Green River Basin, with cuneate-oblong and shortly petioled leaves and ovate bracts with simply acute tips and variable processes. The type is my specimens from Dolly Varden Smelter, E. Nevada, July, 1894. Allied forms are from Amedee, Cal., near Honey Lake, and from Dutch Mt., W. Utah

A. acanthocarpa var. cuneata(A Nelson Bot. Gaz. 34 357), A. cuneata Nels. l. c.

A. corrugata Watson.

This species was first discovered by the writer. The following is a description taken from the field. Densely caespitose, forming low and broad mats 1-4 feet in diameter, from which arise innumerable bent stems 1-6 inches long, terminating in very short and leafy spikes; fertile flowers about 3 lines long, 2 lines wide, bracts with deltoid tips, barely acute, and with cuneate sides, entire, free above, lower half densely covered with toothed processes, the rest of the bract flat and smooth; floral leaves oblong, 6 lines long, sessile, stem leaves oblong-lanceolate, 6 lines long, 1½-2 lines wide, plane, entire, obtuse, barely petioled, very many, leathery; whole plant hoary, very common in the Navajo Basin. Distantly related to A. confertifolia, but nearer to A. Nuttallii. Perhaps its nearest relative is A. Greggii.

A. phyllostegia (Torr.) Watson, A. Draconis Jones Cont. 8 40. Reported from Montana by Rydberg, but manifestly an error.

A. truncata var. saccaria (Watson Proc. Am. Acad. 9 112 (1874.) A saccaria Watson l. c.

A expansa var. Mohavensis.

Fruiting bracts nearly reniform, more rigid, edges with many

and minute teeth, narrow, curved, nearly sessile; stems angled. Mojave region to San Bernardino, Cal., Jones, Parish.

A. argentea Nutt. A. nodosa Greene Pitt. 1 40, A. volutans A. Nelson.

Var. **cornuta** (Jones Cont. 7 718), A. cornuta, Jones l. c.

Var. **Hillmani**.

Bracts panduriform to orbicular, 2-4 lines wide, with triangular and very short and sharp processes; leaves broadly lanceolate, 6 lines long, nearly sessile, with a cuneate base; widely spreading, much branched, low, 6 inches high. Reno, Nevada, Hillman.

A. Nelsoni.

Fruiting bracts panduriform to orbicular, 2-4 lines wide, with very broad and green margins which are simply wavy or erose along the top and extending down the sides, sides also cleft to the body of the seed into one or more truncate lobes, sides mostly unappendaged, but occasionally with similar but shorter processes. No. 5311 A. Nelson, Howell Lake, Wyo., Sept. 13, 1898, distributed as A. expansa. This is apparently a very good species, but it may prove to be only an aberrant form.

A. sabulosa.

Low and tufted shrubs with the habit of A. acanthocarpa var. cuneata, woody only at base where the stems are decumbent, about 1 foot high, stems sparingly branched at base, round, not spinescent, herbaceous, very leafy; leaves ovate to obovate or oval, about 1 inch long, rounded at tip and cuneate below, entire, thick, on short petioles, white-scurfy; flowers in simple and leafy panicles with appressed branches; bracts at least the central ones pediceled, panduriform, flat, about 3 lines wide, very shortly-triangular toothed nearly to base, face without appendages, united one-third the way up. This bears the same relation to A. acanthocarpa var. cuneata that A. pabularis does to A. Nuttallii, appearing to be very

distinct, but intergrades occur in the latter, but are not known in the former. No. 4109 Jones, Winslow, Ariz., Sept., 1884, distributed as A. Greggii.

LEPTOCHLOA.

The Department of Agriculture is to be congratulated upon the recent monograph on Leptochloa by Mr. Hitchcock. It is the best thing on grasses since the work of Dewey. During the Scribnerian regime the Division went into eclipse, and later became a laughing stock on the publication of the twenty-three species manufactured out of Elymus Sitanion, but it seems that the new Agrostologist is determined to restore the prestige of his Division by work that commends itself to experienced men, and not to rainbow chasers. It is also refreshing to see a return to the principles of sound nomenclature and specific limitation so characteristic of Gray and so lacking in the Brittonian school.